Paleobotanical Analysis of Arai-Bazarjugh: A Late Medieval Armenian Caravanserai

Undergraduate Research Thesis

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by

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Abstract:

This project analyzes the paleobotanical remains from the medieval Armenian site, Arai-Bazarjugh, in order to create a detailed botanical description of the environment and the human activities of the caravanserai represented in the plant remains. Arai-Bazarjugh was a medieval Armenian caravanserai, or traveler's inn commonly used as a safe place for traders to stay, occupied from the thirteenth century and eventually abandoned in the mid – fifteenth century. The paleobotanical samples were sorted and identified to family or genus. After identification, each category was counted and recorded to compare these results across all samples to track the occurrence of different families of plants across the entire site. Wheat and barley were the most frequently encountered cultivated taxa. Millet was also identified in a high number of samples, indicating seasonality in agriculture. Other agricultural seeds were found in small quantities, including legumes, fig, date, pomegranate, almond, olive, grape and cotton. The wild and weedy taxa identified was very diverse, but *Rumex sp.* and the Cyperaceae family occurred in the greatest number of samples. Other weedy and wild types indicate a diverse landscape with rivers and river beds, open pasture lands, and woodlands. Nearby the Arai-Bazarjugh caravanserai, a medieval village was excavated and future analysis of the archaeobotanical remains will allow for comparison between the two sites to further determine the location of processing, what crops and other botanical goods were being trade, which taxa were being kept for local use, and how this changed over time. There is little archaeological research analyzing the botanical remains from Armenia during the Medieval Age, especially when studying the caravanserai. A general description of the site is needed and further research must be conducted in the region before comparison is possible.

Introduction:

The purpose of this research project is to analyze the archaeobotanical remains from the medieval Armenian caravanserai, Arai-Bazarjugh. Few archaeobotanical studies have been conducted in Armenia and even fewer have been conducted on caravanserai sites in the Caucasus Mountains. This research project has aimed at creating a general overview of the paleobotanical environment of the caravanserai, while also qualitatively analyzing the presence of agricultural products and uncultivated plant types. A description of the archaeobotanical samples will provide information on crop production and types of cultivated plants, trade and the movement of goods, the occurrence of processing, and the presence of weedy and uncultivated types of plants.

The Arai-Bazarjugh caravanserai was excavated by Kathryn Franklin of the School of the Art Institute of Chicago and the Project for the Archaeology and Geography of Ancient Transcaucasian Societies in 2011. Initial processing of the archaeobotanical remains was conducted by Roman Hovsepyan of the Republic of Armenia National Academy of Sciences Institute of Archaeology and Ethnography. The samples were sent to the lab of Joy McCorriston of the Ohio State University.

Background:

A caravanserai, also called a *caravantun* or *ijevanatun* in Armenian, was a road inn along trade highways during the medieval period. These structures represented a safe place for travelers and merchants to spend the night with their animals and goods. As the caravans traveled the trade highways, commonly called the Silk Road, which connected the major cities throughout Europe, the Near East and Asia, they were frequently attacked and robbed of their goods. These

inns acted as a place for protecting trade, as well as an indicator of the local rule of dynastic families (Franklin 2014b). Caravanserais appeared throughout the Near East and Caucasus Mountain region. The architecture of the caravanserais in Armenia paralleled those of Anatolia after the Seljuq conquest. Although there were many different styles of caravanserai, all typically had thick-stoned walls with a single entrance and small, slit windows above eye level (Yavuz 1997). These structures were built for safety and shelter and the architecture highlights this priority with a focus on defense and inability to penetrate the defenses. As well as varying architectural styles, the number of services offered to the travelers varied. Some had elaborate baths and different rooms for travelers to use, while others had no services and were only for shelter (Yavuz 1997). The structures had areas designated to specific purposes, including stables for animals, areas to load and unload goods, and accommodations for people (Yavuz 1997).

During the Late Medieval period, Armenia was regionally controlled by emergent local dynastic families. These families consisted of merchants whose fortunes were built from the developing trade networks and they used these new fortunes to purchase titles and land. The *metsatun* princes administered and controlled the highland provinces of Armenia, but were also at times vassals to the ruling empire or dynasty located at the larger cities, including the Byzantium Empire, Persian Empire, the Georgian Bagratids, the Mongol Ilkhanids, and the Great Seljuq Empire (Babayan et al. 2014). As part of the 12th-century Lawcode of Mxitar of Gosh, the *metsatun* princes were obligated to construct and support churches and caravanserais, as well as elements important in the movement of goods and people, such as market weigh-stations, bridges and roads (Franklin 2016). The revenues collected at the caravanserais were then donated to the building and renovations of churches and other architectural features. By supporting the construction of these large architectural features, the merchant princes were able to visibly

cement their power over the landscape. The monetary support of churches allowed them to convert their material wealth into pious authority over the region and their control of the transport network allowed them to control the flow of people, goods, and information (Franklin 2014b). They connected the material sphere with the spiritual sphere of their subjects and asserted their authority over both. The large architectural features were located prominently on the landscape, making them visible to the local people, but also to travelers. This visibility further concreted the authority of the merchant prince over the region by allowing him to signify their control over the region and people, while simultaneously distinguishing themselves from the rest of the merchant class and creating a self-image of a traditional nobility figure. They conspicuously demonstrated their wealth by physically asserting their name onto the landscape and tying the merchant prince to the greater world of trade and exchange.

The Arai-Bazarjugh caravanserai was constructed by the merchant prince Vache Vachutyan in AD 1213 on the eastern slope of Mt. Aragats, the highest peak in Armenia. The date of the construction is based on an inscription on the lintel recorded by T'oros T'oromayan during his early 20th-century survey of the region; this inscription is no longer visible (Franklin 2014a). The site is located in the modern Aragatsotn province, north of Yerevan, the current capital of Armenia and situated west of the Kasakh River with a spring-fed stream flowing past the caravanserai. The Kasakh River Valley forms a transitional climatic zone because it steadily decreases in elevation north to south with fruit orchards in the south and the northern part of the valley used for modern grain and fodder farming and pastoralism (Franklin 2014a). The Kasakh Valley also was a prominent passage into and out of the mountains separating the major trade centers in the Caucasus Mountain region (Babayan et al. 2015). The Arai-Bazarjugh caravanserai

is situated along a medieval trade highway towards Tbilisi in the north and between the major urban centers of Ani in the west and Dvin in the south.

The caravanserai was a 20 m x 30 m rectangular structure with the 5 m tall northern wall being partially preserved. The external face of the wall was not preserved, however the internal structure allowed for the excavators to determine a three-arched gallery architectural design, similar to medieval Armenian basilica churches and late medieval caravanserais (Franklin 2014b). Four excavation units were opened to investigate the gallery scheme and determine if there was a differentiation of use to parts of the structure. AC1 was located close to the extant wall in the northeast corner of the structure with AC3 directly west of AC1 in the northwest corner of the structure. AC2 was opened to the south of AC1 and AC3 within the caravanserai structure (Figure 1). AC4 was the southernmost excavated unit in the center of the hall with the purpose of locating an entryway.

Figure 1. *Right:* AC2 viewed from the south. Standing wall of caravanserai and AC1 and AC3 visible to north. *Top:* AC3 viewed from northwest with stone floor and trough visible.

Photos courtesy of Kathryn Franklin.

The excavations revealed a galleried space divided by two lines of piers, which would have supported the dividing arches of the hall. The three divisions were further divided by a central hard-packed clay surface raised approximately 50 cm above the western and eastern lateral galleries. These lateral galleries had flagstone floors and a north-south oriented trough following the line of piers, creating further division with the raised central platform (Figure 1). A channel or gutter oriented east-west cut through AC2 and the junction of a central north-south oriented gutter and a second east-west oriented gutter was excavated in AC4. The central north-south gutter ran steeply towards the southern end of the structure towards the entryway. The material remains found in the excavation of these channels included sherds and various iron artifacts with stratified lenses of dark deposits. The majority of these pottery sherds and iron artifacts recovered during excavation were found within the channels, indicating a waste system and the division of space with the center gallery for human use and the lateral galleries for animal use.

The architectural collapse was separated from floor loci by narrow layers of fill, with ceramics dating the initial collapse of the structure to the fifteenth century. After the abandonment and collapse of the structure, the caravanserai continued to be used by locals as a shelter or windbreak, indicated by the presence of burned features in higher stratigraphic layers from after the collapse of the structure. The caravanserai continued to act as a landmark even after abandonment and Vache Vachutyan's authority and regional power continued even after the end of the medieval period.

Methods and Materials:

Twenty-nine archaeobotanical samples were sent to Joy McCorriston at the Ohio State University. The samples were collected in Hubco 10" x 17" canvas sample bags, however the

volume in liters was not provided. The samples were collected from different contexts within the four excavation units (Table 1). These contexts were divided into different architectural features by type, including hearth and burnt features, pits, the channels, the troughs, floor level and below initial collapse fill, and fill during the period of collapse (Figure 2).

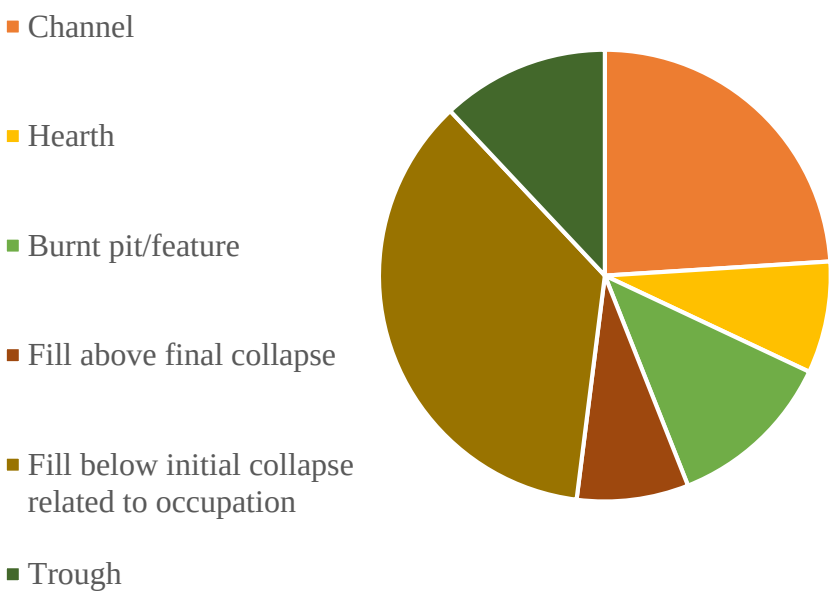
Table 1. Description of context for each locus

FS #	Locus	Context Description	Period
1470	Ar/Ay.AC1.4	Hearth at ground surface	Early modern or contemporary
1471	Ar/Ay.AC1.9	Burnt pit with locus 1.10	After secondary collapse
1472	Ar/Ay.AC1.16	Area of burnt soil overlaying initial collapse	Approx. date 1400-1500 AD
1473	Ar/Ay.AC1.18	Hearth composed of two fallen building stones upon initial collapse	Post-1450
1474	Ar/Ay.AC1.21 (North)	Pre-floor deposit underneath architectural collapse and above stone floor	Early 13th-early 14th c
1475	Ar/Ay.AC1.21 (South)	Pre-floor deposits underneath architectural collapse and above stone floor	Early 13th-early 14th c
1476	Ar/Ay.AC2.7	Dark, soft soil with burn inclusions	Below final architectural collapse and above initial collapse
1477	Ar/Ay.AC2.11	Burnt Feature in northeast corner of unit	Below architectural collapse and above fill covering floor
1478	Ar/Ay.AC2.12	Dark black-gray to dark brown clayey soil beneath collapse	Near-floor/surface, below initial collapse and above compacted floor levels

1479	Ar/Ay.AC2.13	Burnt feature in upper deposits of clay surface	Late medieval (13th-14th c AD)
1480	Ar/Ay.AC2.14.1	Clayey pre-floor deposits mixed with gravelly and burnt material, heterogeneous soil composition; nearest the eastern wall of trench	Late medieval (14th c?)
1481	Ar/Ay.AC2.14.2	Clayey pre-floor deposits mixed with gravelly and burnt material, heterogeneous soil composition; center of excavation unit near channel feature	Late medieval (14th c?)
1482	Ar/Ay.AC2.14.3	Clayey pre-floor deposits mixed with gravelly and burnt material, heterogeneous soil composition; northwest corner of feature near arch	Late medieval (14th c?)
1483	Ar/Ay.AC2.15.1	Stone-lined channel from upper levels of channel fill	Occupation
1485	Ar/Ay.AC2.18	Clayey soil on top of pavement stones in gutter feature	Early 13th c - mid 14th c AD
1486	Ar/Ay.AC3.10.1	Fine, compact soil within stone trough, underneath architectural collapse and burning; southern part of trough	13th-14th c AD (Associated floor date)
1487	Ar/Ay.AC3.10.2	Fine, compact soil within stone trough, underneath architectural collapse and burning; center of trough	13th-14th c AD (Associated floor date)
1488	Ar/Ay.AC3.10.3	Fine, compact soil within stone trough, underneath architectural collapse and burning; northern section of trough	13th-14th c AD (Associated floor date)
1489	Ar/Ay.AC3.14	Fine soil layer directly above stone floor, contained between architectural collapse and stone floor	13th c AD
1491	Ar/Ay.AC4.4	Burnt soil, ash, charcoal and burnt pottery just underneath collapsed ceiling stones	Initial collapse (1400-1500 AD)

1492	Ar/Ay.AC4.6	Top of fill between fallen roof and floor; compacted brown soil, flat-lying ceramics	12th-15th c AD (Ceramics)
1494	Ar/Ay.AC4.9.1	Upper deposit of stained clay soil inside stone gutters; south of eastern clay platform	13th-14th c AD
1495	Ar/Ay.AC4.9.2	Upper deposit of stained clay soil inside stone gutters; southwest corner of excavation unit	13th-14th c AD
1496	Ar/Ay.AC4.9.3	Upper deposit of stained clay soil inside stone gutters; southeast corner of excavation unit	13th-14th c AD
1497	Ar/Ay.AC4.15	Lowest, somewhat mixed deposit of black soil, debris and mud excavated part of waste channel	13th-14th c AD

Figure 2. Context Distribution



Each sample was flotated and twenty-five of the samples were initially sorted by Roman Hovsepyan. The flotation volume was not recorded. The archaeobotanical remains had already been sorted from the soil samples, but still needed to be sorted into family or genus. I finished sorting these samples and began sorting the four unprocessed samples. The samples were sieved

and then sorted by >2mm, >1mm and >500um. I finished sorting FS #1490 and FS #1498, however the identification and counting were not completed at the time of analysis. The seeds were sorted to family or genus when appropriate.

After sorting of a sample was concluded, my advisor, Joy McCorriston, checked the sorting of the sample and identified anything that was identifiable through her own knowledge and the reference collection in her lab. As I finished sorting more samples and studying the already identified seeds, I was able to begin identifying seeds myself. I also studied the reference collection and the literature in the lab to attempt to identify seeds that I had not identified yet. By the completion of the sorting of the final samples, I was completing all of the identifications without Joy McCorriston's assistance. Each identified seed category was then counted and recorded on the locus sorting record and in the excel spreadsheet (Table 2).

Analysis:

Qualitative analysis included description of taxa in two main categories, cultivated and wild and weedy types. Ubiquity and ratios were calculated to determine frequency of presence of individual taxa. Ubiquity calculates the number of samples each taxa appears in through the assemblage, disregarding the absolute count (Popper 1988). Absolute count can be misleading, as they are too influenced by preservation. For example, in this research, the absolute count of *Solanum* sp. is relatively high compared to the other taxa, but it actually only occurs in one sample. The preservation of *Solanum* is either poor in all other samples or this single sample had for some reason a large amount of that single type of seed. It is more probable that *Solanum* does not occur in the rest of the assemblage and that the sample was different. Ubiquity is included in Table 2 and Figure 3 shows the taxa with a ubiquity greater than two, or appearing in more than ten percent of the samples.

Table 1. Arai-Bazarjugh Archaeobotanical Samples

	Locus	Ar/Ay.AC1.4	AR/AY.AC1.9	AR/AY.AC1.16	AR/AY.AC1.18
	FS #	1470	1471	1472	1473
	Context	2	3	4	2
Hordeum sp. grain		1		4	2
Hordeum spontaneum grain		–	–	–	–
Hordeum sp. rachis		–	–	–	–
Hordeum frag		–	–	–	–
Triticum aestivum rachis		–	–	1	1
Triticum sp. grain		–	2	14	7
Triticum frag gl/sf		–	–	–	–
Triticum sp. Sf/rachis		–	–	–	–
Setaria/Panicum grain		–	–	11	–
Cereal grain indet.		–	–	–	7
Cereal frags		–	1	15	–
Culm frags		–	–	–	–
Caryophyllaceae		–	–	–	–
Reseda sp.		–	1	–	–
Shell		–	–	–	–
Ficus sp.		–	–	–	–
Fabaceae		–	–	–	–
Large legume frags		–	–	–	–
Lens culinaris		–	–	–	–
Vicia faba		–	–	–	–
Cicer arietinum		–	–	–	–
Lathyrus sativus		–	–	–	–
Citrullus sp. Cf. Colocynthus		–	–	–	–
Punicum granatum		–	–	–	–
Vitis sp. (entire)		–	–	–	–
Vitis sp. Shell frags		–	–	–	–
Crucifereae		–	–	–	–
Olea sp.		–	–	–	–
Straw in dung frags		–	–	–	27
Convolvulus sp.		–	–	–	–
Rumex sp.		1	–	15	60
Adonis sp.		–	–	–	–
Celtis orientalis		–	–	–	–
Chrosophora sp.		–	–	–	–
Portulaca sp.		–	–	–	–
Crataegus sp. Shell		–	–	–	–
Teucrium sp.		–	–	–	3
Silene sp.		–	–	–	–
Gypsophila sp.		–	–	–	–
Fumaria sp.		–	2	–	–
Small wild legumes		–	–	–	–
Malva sp.		–	–	1	13
Heliotropium sp.		–	–	–	–
Gossypium sp.		–	–	–	–
Galium sp.		–	–	–	5
Solanaceae		–	–	–	–
Hyoscamus sp.		4	8	–	–
Plantago sp.		–	–	–	1
Scabiosa sp.		–	–	1	–
Pimpinella type		–	–	–	–
Solanum sp.		–	–	–	–
Lygia pubescens		–	–	–	–
Euphorbiaceae		–	–	–	–

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	Ar/Ay.AC1.4	AR/AY.AC1.9	AR/AY.AC1.16	AR/AY.AC1.18
	FS #	1470	1471	1472	1473
	Context	2	3	4	2
Bobelmoeshus/Schoenoplectus		–	–	–	–
Modern Amaranthus		–	–	–	–
Anchusa arvensis		–	–	–	24
Anchusa sp.		–	–	–	–
Boraginaceae Arnebia		–	–	–	–
Bugloissoides arvensis		–	–	57	4
Rubiaceae		–	–	–	–
Coronilla sp.		–	–	–	–
Phoenix sp.		–	–	–	–
Neslia apiculata		–	–	–	–
Neslia sp.		1	–	–	–
Chenopodium/Amaranthus		–	–	–	–
Chenopodium sp.		2	–	–	–
Arnebia sp.		–	–	–	–
Euphorbia sp.		–	–	–	–
Arnebia decumbens		–	–	–	–
Amgydalus communis		–	–	–	–
Cyperaceae		–	1	–	–
Carex sp./Schoenoplectus types		–	–	4	1
Eleocharis type		–	–	–	–
Aegilops crassa gl/sf		–	–	–	–
wild grasses		–	1	–	1
Bromus type		–	–	–	–
Lolium type		–	–	–	–
Receptacle (centaurea)		–	–	–	–
Unidentified items		–	–	9	10
Indeterminate		3	2	6	–
Modern seeds		–	–	2	–
Glassy nodules		–	–	2	–
Wood		–	–	–	–
Dung		–	–	–	–
Unknown 1		–	–	–	–
Unknown 2		–	–	–	–
Unknown 3		–	–	–	–
Unknown 4		–	–	–	–
Unknown 5		–	1	–	3
Unknown 6		–	–	–	1
Unknown 7		–	–	–	1
Unknown 8		–	1	1	–
Unknown 9		–	–	1	–
Unknown 10		–	–	–	–
Unknown 11		–	–	–	–
Unknown 13		–	–	–	–
Unknown 14		–	1	–	–
Unknown 15		–	–	–	–
Unknown 16		–	–	–	–
Unknown 17		–	–	–	–
Total in each sample		12	21	144	171

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC1.21	AR/AY.AC1.21	AR/AY.AC2.7	AR/AY.AC2.11
	FS #	1474	1475	1476	1477
	Context	5	5	4	4
Hordeum sp. grain		5	3	–	–
Hordeum spontaneum grain		–	–	–	–
Hordeum sp. rachis		–	–	–	–
Hordeum frag		–	–	–	–
Triticum aestivum rachis		–	–	–	–
Triticum sp. grain		4	2		
Triticum frag gl/sf		–	–	–	–
Triticum sp. Sf/rachis		–	–	–	–
Setaria/Panicum grain		–	–	–	–
Cereal grain indet.		5	4	1	10
Cereal frags		–	–	–	17
Culm frags		–	–	–	–
Caryophyllaceae		–	–	–	–
Reseda sp.		–	–	–	–
Shell		–	–	–	–
Ficus sp.		–	–	–	–
Fabaceae		–	–	–	–
Large legume frags		–	–	–	–
Lens culinaris		–	–	1	–
Vicia faba		–	–	–	–
Cicer arietinum		–	–	1	–
Lathyrus sativus		–	–	–	–
Citrullus sp. Cf. Colocynthus		–	–	–	–
Punicum granatum		–	–	–	–
Vitis sp. (entire)		–	–	–	–
Vitis sp. Shell frags		–	–	–	–
Crucifereae		–	–	1	–
Olea sp.		–	–	–	–
Straw in dung frags		–	–	–	–
Convolvulus sp.		–	–	–	–
Rumex sp.		–	–	–	9
Adonis sp.		–	–	–	–
Celtis orientalis		–	–	–	–
Chrosophora sp.		–	–	–	–
Portulaca sp.		–	–	–	–
Crataegus sp. Shell		–	–	–	–
Teucrium sp.		–	–	–	–
Silene sp.		–	–	–	–
Gypsophila sp.		–	–	–	–
Fumaria sp.		–	–	–	–
Small wild legumes		–	–	2	–
Malva sp.		–	–	–	1
Heliotropium sp.		–	–	–	–
Gossypium sp.		–	–	–	–
Galium sp.		–	–	1	–
Solanaceae		–	–	–	–
Hyoscamus sp.		–	–	–	–
Plantago sp.		–	–	–	–
Scabiosa sp.		–	–	1	–
Pimpinella type		–	–	–	–
Solanum sp.		–	–	–	–
Lygia pubescens		–	–	–	–
Euphorbiaceae		–	–	–	–

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC1.21	AR/AY.AC1.21	AR/AY.AC2.7	AR/AY.AC2.11
	FS #	1474	1475	1476	1477
	Context	5	5	4	4
Bobelmoeshus/Schoenoplectus		–	–	–	–
Modern Amaranthus		–	–	3	–
Anchusa arvensis		–	–	–	–
Anchusa sp.		–	–	–	–
Boraginaceae Arnebia		–	2	–	–
Bugloissoides arvensis		–	–	–	–
Rubiaceae		–	–	–	–
Coronilla sp.		–	–	–	3
Phoenix sp.		–	–	–	–
Neslia apiculata		–	–	–	–
Neslia sp.		–	–	–	–
Chenopodium/Amaranthus		–	–	–	–
Chenopodium sp.		–	–	–	–
Arnebia sp.		–	–	–	–
Euphorbia sp.		–	–	–	–
Arnebia decumbens		–	–	–	1
Amgydalus communis		–	–	–	–
Cyperaceae		2	–	7	8
Carex sp./Schoenoplectus types		–	–	–	–
Eleocharis type		–	–	–	–
Aegilops crassa gl/sf		–	–	–	–
wild grasses		–	–	–	–
Bromus type		–	–	–	–
Lolium type		–	–	–	–
Receptacle (centaurea)		–	–	–	–
Unidentified items		–	–	–	–
Indeterminate		–	–	3	5
Modern seeds		–	–	1	–
Glassy nodules		1	–	3	–
Wood		1	–	–	–
Dung		–	–	–	–
Unknown 1		–	–	–	–
Unknown 2		–	–	–	–
Unknown 3		–	–	–	–
Unknown 4		–	–	–	–
Unknown 5		–	–	–	–
Unknown 6		–	–	–	–
Unknown 7		–	–	–	–
Unknown 8		–	–	–	–
Unknown 9		–	–	–	–
Unknown 10		–	–	–	–
Unknown 11		1	–	–	–
Unknown 13		–	–	–	–
Unknown 14		–	–	–	–
Unknown 15		–	–	–	1
Unknown 16		–	–	–	–
Unknown 17		–	–	–	–
Total in each sample		19	11	25	55

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC2.12	AR/AY.AC2.13	AR/AY.AC2.14.1	AR/AY.AC2.14.2
	FS #	1478	1479	1480	1481
	Context	5	5	5	5
Hordeum sp. grain		–	1	–	–
Hordeum spontaneum grain		–	–	–	–
Hordeum sp. rachis		–	–	–	–
Hordeum frag		–	–	–	–
Triticum aestivum rachis		–	–	–	–
Triticum sp. grain		8	1	–	–
Triticum frag gl/sf		–	–	–	–
Triticum sp. Sf/rachis		–	–	–	–
Setaria/Panicum grain		–	2	–	4
Cereal grain indet.		–	1	–	–
Cereal frags		–	–	1	–
Culm frags		–	–	–	–
Caryophyllaceae		–	–	–	–
Reseda sp.		–	–	–	–
Shell		–	–	–	–
Ficus sp.		–	3	–	–
Fabaceae		–	–	–	–
Large legume frags		–	–	–	–
Lens culinaris		–	–	–	–
Vicia faba		–	–	–	–
Cicer arietinum		–	–	–	–
Lathyrus sativus		–	–	–	–
Citrullus sp. Cf. Colocynthus		–	–	–	–
Punicum granatum		–	–	–	–
Vitis sp. (entire)		–	–	–	–
Vitis sp. Shell frags		–	–	–	–
Crucifereae		–	–	–	–
Olea sp.		–	–	–	–
Straw in dung frags		–	–	–	–
Convolvulus sp.		–	–	–	–
Rumex sp.		17	–	6	9
Adonis sp.		–	–	–	1
Celtis orientalis		–	–	–	–
Chrosophora sp.		–	–	1	–
Portulaca sp.		–	–	1	–
Crataegus sp. Shell		–	–	–	–
Teucrium sp.		–	–	–	–
Silene sp.		1	1	–	–
Gypsophila sp.		–	–	–	–
Fumaria sp.		–	–	–	–
Small wild legumes		23	–	6	32
Malva sp.		2	14	–	–
Heliotropium sp.		–	–	–	–
Gossypium sp.		–	–	–	–
Galium sp.		–	1	4	–
Solanaceae		–	–	–	–
Hyoscamus sp.		6	–	–	2
Plantago sp.		–	–	1	–
Scabiosa sp.		–	1	–	–
Pimpinella type		–	–	–	–
Solanum sp.		–	–	–	–
Lygia pubescens		–	–	–	–
Euphorbiaceae		–	–	–	–

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC2.12	AR/AY.AC2.13	AR/AY.AC2.14.1	AR/AY.AC2.14.2
	FS #	1478	1479	1480	1481
	Context	5	5	5	5
Bobelmoeshus/Schoenoplectus		–	–	4	–
Modern Amaranthus		–	–	–	–
Anchusa arvensis		–	–	–	–
Anchusa sp.		–	–	–	–
Boraginaceae Arnebia		–	–	–	–
Bugloissoides arvensis		–	–	–	–
Rubiaceae		–	–	–	–
Coronilla sp.		–	–	–	–
Phoenix sp.		–	–	–	–
Neslia apiculata		–	–	–	–
Neslia sp.		–	–	–	–
Chenopodium/Amaranthus		–	–	–	1
Chenopodium sp.		1	1	–	–
Arnebia sp.		–	–	–	1
Euphorbia sp.		–	–	–	–
Arnebia decumbens		–	–	–	–
Amgydalus communis		–	–	–	–
Cyperaceae		5	21	–	–
Carex sp./Schoenoplectus types		3	–	–	3
Eleocharis type		–	–	–	–
Aegilops crassa gl/sf		–	–	–	–
wild grasses		5	–	–	–
Bromus type		–	–	–	–
Lolium type		–	–	–	–
Receptacle (centaurea)		–	–	–	–
Unidentified items		–	–	–	–
Indeterminate		69	41	17	18
Modern seeds		–	–	–	–
Glassy nodules		–	–	–	–
Wood		–	1	–	1
Dung		–	1	–	–
Unknown 1		–	–	–	–
Unknown 2		–	–	–	–
Unknown 3		–	–	–	–
Unknown 4		–	–	–	–
Unknown 5		–	–	–	–
Unknown 6		–	–	–	–
Unknown 7		1	–	–	–
Unknown 8		–	–	–	–
Unknown 9		–	–	–	–
Unknown 10		–	–	–	1
Unknown 11		–	–	–	–
Unknown 13		–	–	–	–
Unknown 14		–	–	–	–
Unknown 15		–	–	–	–
Unknown 16		2	–	1	–
Unknown 17		–	–	–	–
Total in each sample		143	90	42	73

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC2.14.3	AR/AY.AC2.15.1	AR/AY.AC2.18	AR/AY.AC3.10.1
	FS #	1482	1483	1485	1486
	Context	5	1	1	6
Hordeum sp. grain		–	13	120	–
Hordeum spontaneum grain		–	–	5	–
Hordeum sp. rachis		–	1	–	–
Hordeum frag		–	4	–	–
Triticum aestivum rachis		–	–	–	–
Triticum sp. grain		–	6	80	–
Triticum frag gl/sf		–	2	1	–
Triticum sp. Sf/rachis		–	10	48	–
Setaria/Panicum grain		1	9	2	–
Cereal grain indet.		1	–	24	2
Cereal frags		–	8	56	–
Culm frags		–	–	18	–
Caryophyllaceae		–	–	–	–
Reseda sp.		–	–	–	–
Shell		–	–	1	–
Ficus sp.		–	2	–	–
Fabaceae		–	–	115	–
Large legume frags		–	–	–	–
Lens culinaris		–	–	–	–
Vicia faba		–	–	1	–
Cicer arietinum		–	–	–	–
Lathyrus sativus		–	–	–	–
Citrullus sp. Cf. Colocynthus		–	–	–	–
Punicum granatum		–	–	–	–
Vitis sp. (entire)		–	1	1	–
Vitis sp. Shell frags		–	4	–	–
Crucifereae		–	–	–	–
Olea sp.		–	1	–	–
Straw in dung frags		–	–	–	–
Convolvulus sp.		–	–	–	–
Rumex sp.		1	25	308	1
Adonis sp.		–	–	2	–
Celtis orientalis		–	–	1	–
Chrosophora sp.		–	–	–	–
Portulaca sp.		–	–	–	–
Crataegus sp. Shell		–	–	–	–
Teucrium sp.		–	–	–	–
Silene sp.		–	–	–	–
Gypsophila sp.		–	2	–	–
Fumaria sp.		–	–	–	–
Small wild legumes		–	4	20	–
Malva sp.		–	3	2	–
Heliotropium sp.		–	1	–	–
Gossypium sp.		–	1	–	–
Galium sp.		–	6	7	–
Solanaceae		–	–	–	–
Hyoscamus sp.		–	5	1	–
Plantago sp.		–	–	2	–
Scabiosa sp.		–	–	2	–
Pimpinella type		–	–	10	–
Solanum sp.		–	–	43	–
Lygia pubescens		–	–	1	–
Euphorbiaceae		–	–	2	–

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC2.14.3	AR/AY.AC2.15.1	AR/AY.AC2.18	AR/AY.AC3.10.1
	FS #	1482	1483	1485	1486
	Context	5	1	1	6
Bobelmoeshus/Schoenoplectus		–	–	–	–
Modern Amaranthus		–	–	–	–
Anchusa arvensis		–	–	–	–
Anchusa sp.		–	–	–	–
Boraginaceae Arnebia		–	–	–	–
Bugloissoides arvensis		–	5	31	–
Rubiaceae		–	–	–	1
Coronilla sp.		–	–	–	–
Phoenix sp.		–	–	–	–
Neslia apiculata		–	–	–	1
Neslia sp.		–	–	–	–
Chenopodium/Amaranthus		–	–	–	–
Chenopodium sp.		–	–	5	–
Arnebia sp.		–	–	–	–
Euphorbia sp.		–	–	–	–
Arnebia decumbens		–	–	–	–
Amgydalus communis		–	–	–	–
Cyperaceae		–	–	16	–
Carex sp./Schoenoplectus types		11	–	1	–
Eleocharis type		–	2	23	–
Aegilops crassa gl/sf		–	–	2	–
wild grasses		–	–	90	–
Bromus type		–	3	1	–
Lolium type		–	2	–	1
Receptacle (centaurea)		–	–	2	–
Unidentified items		–	12	–	–
Indeterminate		–	–	189	1
Modern seeds		–	–	5	–
Glassy nodules		–	–	–	–
Wood		–	–	–	–
Dung		–	–	1	–
Unknown 1		–	4	–	–
Unknown 2		–	4	–	–
Unknown 3		–	1	–	–
Unknown 4		–	2	–	–
Unknown 5		–	–	1	–
Unknown 6		–	–	–	–
Unknown 7		–	–	–	–
Unknown 8		–	–	–	–
Unknown 9		–	–	–	–
Unknown 10		–	–	2	–
Unknown 11		–	–	–	–
Unknown 13		–	–	–	–
Unknown 14		–	–	24	–
Unknown 15		–	–	–	–
Unknown 16		–	–	6	–
Unknown 17		–	–	3	–
Total in each sample		14	143	1275	7

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC3.10.2	AR/AY.AC3.10.3	AR/AY.AC3.14	AR/AY.AC4.4
	FS #	1487	1488	1489	1491
	Context	6	6	5	5
Hordeum sp. grain		2	1	–	–
Hordeum spontaneum grain		–	–	–	–
Hordeum sp. rachis		–	–	–	–
Hordeum frag		–	–	–	–
Triticum aestivum rachis		–	–	–	1
Triticum sp. grain		–	–	–	9
Triticum frag gl/sf		–	–	–	–
Triticum sp. Sf/rachis		–	–	–	–
Setaria/Panicum grain		1	–	–	–
Cereal grain indet.		1	–	–	12
Cereal frags		–	–	–	3
Culm frags		–	–	–	–
Caryophyllaceae		–	–	–	–
Reseda sp.		–	–	–	–
Shell		–	–	–	–
Ficus sp.		–	–	–	–
Fabaceae		–	–	–	–
Large legume frags		–	–	–	–
Lens culinaris		–	–	–	–
Vicia faba		–	–	–	–
Cicer arietinum		–	–	–	–
Lathyrus sativus		–	–	–	1
Citrullus sp. Cf. Colocynthus		–	–	–	–
Punicum granatum		–	–	–	–
Vitis sp. (entire)		–	–	–	–
Vitis sp. Shell frags		–	–	–	–
Crucifereae		–	–	–	–
Olea sp.		–	–	–	–
Straw in dung frags		–	–	–	–
Convolvulus sp.		–	–	–	–
Rumex sp.		1	–	–	–
Adonis sp.		–	–	–	–
Celtis orientalis		–	–	–	–
Chrosophora sp.		–	–	–	–
Portulaca sp.		–	–	–	–
Crataegus sp. Shell		–	–	–	–
Teucrium sp.		–	–	–	–
Silene sp.		–	–	–	–
Gypsophila sp.		–	–	1	–
Fumaria sp.		–	–	–	–
Small wild legumes		–	–	–	6
Malva sp.		–	–	–	1
Heliotropium sp.		–	–	–	–
Gossypium sp.		–	–	–	–
Galium sp.		–	–	–	1
Solanaceae		–	–	–	–
Hyoscamus sp.		–	–	–	4
Plantago sp.		–	–	–	–
Scabiosa sp.		–	–	–	–
Pimpinella type		–	–	–	–
Solanum sp.		–	–	–	–
Lygia pubescens		–	–	–	–
Euphorbiaceae		–	–	–	–

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC3.10.2	AR/AY.AC3.10.3	AR/AY.AC3.14	AR/AY.AC4.4
	FS #	1487	1488	1489	1491
	Context	6	6	5	5
Bobelmoeshus/Schoenoplectus		–	–	–	–
Modern Amaranthus		–	–	–	–
Anchusa arvensis		–	–	–	–
Anchusa sp.		–	–	–	–
Boraginaceae Arnebia		–	–	–	–
Bugloissoides arvensis		–	–	–	–
Rubiaceae		–	–	–	–
Coronilla sp.		–	–	–	–
Phoenix sp.		–	–	–	–
Neslia apiculata		–	–	–	–
Neslia sp.		–	–	–	–
Chenopodium/Amaranthus		–	–	–	–
Chenopodium sp.		–	–	–	–
Arnebia sp.		–	–	–	–
Euphorbia sp.		–	–	–	2
Arnebia decumbens		–	–	–	9
Amgydalus communis		–	–	–	–
Cyperaceae		2	–	–	–
Carex sp./Schoenoplectus types		–	–	–	12
Eleocharis type		–	–	–	–
Aegilops crassa gl/sf		–	–	–	–
wild grasses		–	–	–	2
Bromus type		–	–	–	–
Lolium type		–	–	1	–
Receptacle (centaurea)		–	–	–	–
Unidentified items		–	–	–	–
Indeterminate		–	4	1	6
Modern seeds		–	–	–	5
Glassy nodules		–	–	–	–
Wood		–	–	–	–
Dung		–	–	–	–
Unknown 1		–	–	–	–
Unknown 2		–	–	–	–
Unknown 3		–	–	–	–
Unknown 4		–	–	–	–
Unknown 5		–	–	–	–
Unknown 6		–	–	–	–
Unknown 7		–	–	–	–
Unknown 8		–	–	–	–
Unknown 9		–	–	–	–
Unknown 10		–	–	–	–
Unknown 11		–	–	–	–
Unknown 13		–	–	–	–
Unknown 14		–	–	–	–
Unknown 15		–	–	–	–
Unknown 16		–	–	–	–
Unknown 17		–	–	–	–
Total in each sample		7	5	3	74

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC4.6	AR/AY.AC4.9.1	AR/AY.AC4.9.2	AR/AY.AC4..3
	FS #	1492	1494	1495	1496
	Context	5	1	1	1
Hordeum sp. grain		–	8	–	4
Hordeum spontaneum grain		–	–	–	–
Hordeum sp. rachis		–	1	–	–
Hordeum frag		–	–	–	–
Triticum aestivum rachis		–	–	–	–
Triticum sp. grain		–	3	–	2
Triticum frag gl/sf		–	–	–	–
Triticum sp. Sf/rachis		–	–	–	–
Setaria/Panicum grain		–	9	–	–
Cereal grain indet.		5	–	–	–
Cereal frags		–	12	–	6
Culm frags		–	–	–	–
Caryophyllaceae		–	1	–	–
Reseda sp.		61	5	–	–
Shell		–	–	–	–
Ficus sp.		–	–	–	–
Fabaceae		–	–	–	–
Large legume frags		–	2	–	–
Lens culinaris		–	–	–	–
Vicia faba			–	–	–
Cicer arietinum		–	–	–	–
Lathyrus sativus		–	–	–	–
Citrullus sp. Cf. Colocynthus		–	2	–	–
Punicum granatum		–	2	–	–
Vitis sp. (entire)		–	–	–	–
Vitis sp. Shell frags		–	–	–	–
Crucifereae		–	–	–	–
Olea sp.		–	–	–	–
Straw in dung frags		–	–	–	–
Convolvulus sp.		–	2	–	–
Rumex sp.		154	44	12	–
Adonis sp.		–	–	–	–
Celtis orientalis		–	–	–	–
Chrosophora sp.		–	–	–	–
Portulaca sp.		–	–	–	–
Crataegus sp. Shell		–	–	–	1
Teucrium sp.		–	–	–	–
Silene sp.		–	–	–	–
Gypsophila sp.		1	1	–	–
Fumaria sp.		–	–	–	–
Small wild legumes		42	20	–	4
Malva sp.		8	5	–	–
Heliotropium sp.		–	1	–	–
Gossypium sp.		–	–	–	–
Galium sp.		–	2	–	–
Solanaceae		–	2	–	–
Hyoscamus sp.		4	229	–	–
Plantago sp.		–	–	–	–
Scabiosa sp.		–	–	–	–
Pimpinella type		–	–	–	–
Solanum sp.		–	–	–	–
Lygia pubescens		–	–	–	–
Euphorbiaceae		–	–	–	–

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC4.6	AR/AY.AC4.9.1	AR/AY.AC4.9.2	AR/AY.AC4..3
	FS #	1492	1494	1495	1496
	Context	5	1	1	1
Bobelmoeshus/Schoenoplectus		–	–	–	–
Modern Amaranthus		–	–	–	–
Anchusa arvensis		–	–	–	–
Anchusa sp.		–	1	–	–
Boraginaceae Arnebia		–	–	–	–
Bugloissoides arvensis		6	–	–	–
Rubiaceae		–	–	–	–
Coronilla sp.		–	–	–	–
Phoenix sp.		–	1	–	–
Neslia apiculata		–	1	–	–
Neslia sp.		–	–	–	–
Chenopodium/Amaranthus		–	–	–	–
Chenopodium sp.		4	21	–	–
Arnebia sp.		–	–	–	–
Euphorbia sp.		–	–	–	–
Arnebia decumbens		–	2	–	–
Amgydalus communis		–	–	–	–
Cyperaceae		39	30	–	–
Carex sp./Schoenoplectus types		15	–	–	8
Eleocharis type		–	–	–	–
Aegilops crassa gl/sf		–	–	–	
wild grasses		–	19	–	1
Bromus type		–	–	–	–
Lolium type		–	–	–	–
Receptacle (centaurea)		–	–	–	–
Unidentified items		–	8	–	2
Indeterminate		41	66	–	–
Modern seeds		–	9	–	1
Glassy nodules		–	–	–	–
Wood		–	–	–	–
Dung		–	–	–	–
Unknown 1		–	–	–	–
Unknown 2		–	–	–	–
Unknown 3		–	–	–	–
Unknown 4		–	–	–	–
Unknown 5		–	–	–	–
Unknown 6		–	–	–	–
Unknown 7		–	–	–	–
Unknown 8		–	–	–	–
Unknown 9		–	–	–	–
Unknown 10		1	–	–	–
Unknown 11		–	–	–	–
Unknown 13		–	1	–	–
Unknown 14		–	–	–	–
Unknown 15		1	–	–	–
Unknown 16		–	–	–	–
Unknown 17		–	–	–	–
Total in each sample		382	510	12	29

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC4.15	Count	Ubiquity	(U/N)*100
	FS #	1497			
	Context	1			
Hordeum sp. grain		–	164	12	48.00
Hordeum spontaneum grain		–	5	1	4.00
Hordeum sp. rachis		–	2	2	8.00
Hordeum frag		–	4	1	4.00
Triticum aestivum rachis		–	3	3	12.00
Triticum sp. grain		–	138	12	48.00
Triticum frag gl/sf		–	3	2	8.00
Triticum sp. Sf/rachis		–	58	2	8.00
Setaria/Panicum grain		–	39	8	32.00
Cereal grain indet.		–	73	12	48.00
Cereal frags		–	119	9	36.00
Culm frags		–	18	1	4.00
Caryophyllaceae		–	1	1	4.00
Reseda sp.		–	67	3	12.00
Shell		–	1	1	4.00
Ficus sp.		–	5	2	8.00
Fabaceae		–	115	1	4.00
Large legume frags		–	2	1	4.00
Lens culinaris		–	1	1	4.00
Vicia faba		–	1	1	4.00
Cicer arietinum		–	1	1	4.00
Lathyrus sativus		–	1	1	4.00
Citrullus sp. Cf. Colocynthus		–	2	1	4.00
Punicum granatum		–	2	1	4.00
Vitis sp. (entire)		–	2	2	8.00
Vitis sp. Shell frags		–	4	1	4.00
Crucifereae		–	1	1	4.00
Olea sp.		–	1	1	4.00
Straw in dung frags		–	27	1	4.00
Convolvulus sp.		–	2	1	4.00
Rumex sp.		–	663	15	60.00
Adonis sp.		–	3	2	8.00
Celtis orientalis		–	1	1	4.00
Chrosophora sp.		–	1	1	4.00
Portulaca sp.		–	1	1	4.00
Crataegus sp. Shell		–	1	1	4.00
Teucrium sp.		–	3	1	4.00
Silene sp.		–	2	2	8.00
Gypsophila sp.		–	5	4	16.00
Fumaria sp.		–	2	1	4.00
Small wild legumes		–	159	10	40.00
Malva sp.		–	50	10	40.00
Heliotropium sp.		–	2	2	8.00
Gossypium sp.		–	1	1	4.00
Galium sp.		–	27	8	32.00
Solanaceae		–	2	1	4.00
Hyoscamus sp.		–	263	9	34.00
Plantago sp.		–	4	3	12.00
Scabiosa sp.		–	5	4	16.00
Pimpinella type		–	10	1	4.00
Solanum sp.		–	43	1	4.00
Lygia pubescens		–	1	1	4.00
Euphorbiaceae		–	2	1	4.00

Table 1 Continued. Arai-Bazarjugh Archaeobotanical Samples

	Locus	AR/AY.AC4.15	Count	Ubiquity	(U/N)*100
	FS #	1497			
	Context	1			
Bobelmoeshus/Schoenoplectus		–	4	1	4.00
Modern Amaranthus		–	3	1	4.00
Anchusa arvensis		–	24	1	4.00
Anchusa sp.		–	1	1	4.00
Boraginaceae Arnebia		–	2	1	4.00
Bugloissoides arvensis		–	103	5	20.00
Rubiaceae		–	1	1	4.00
Coronilla sp.		–	3	1	4.00
Phoenix sp.		–	1	1	4.00
Neslia apiculata		–	2	2	8.00
Neslia sp.		–	1	1	4.00
Chenopodium/Amaranthus		–	1	1	4.00
Chenopodium sp.		–	34	6	24.00
Arnebia sp.		–	1	1	4.00
Euphorbia sp.		–	2	1	4.00
Arnebia decumbens		–	12	3	12.00
Amgydalus communis		1	1	1	4.00
Cyperaceae		–	131	10	40.00
Carex sp./Schoenoplectus types		–	58	9	36.00
Eleocharis type		–	25	2	8.00
Aegilops crassa gl/sf		–	2	1	4.00
wild grasses		–	119	7	28.00
Bromus type		–	4	2	8.00
Lolium type		–	4	3	12.00
Receptacle (centaurea)		–	2	1	4.00
Unidentified items		–	41	5	20.00
Indeterminate		–	472	16	64.00
Modern seeds		–	23	6	24.00
Glassy nodules		–	6	3	12.00
Wood		–	3	3	12.00
Dung		–	2	2	8.00
Unknown 1		–	4	1	4.00
Unknown 2		–	4	1	4.00
Unknown 3		–	1	1	4.00
Unknown 4		–	2	1	4.00
Unknown 5		–	5	3	12.00
Unknown 6		–	1	1	4.00
Unknown 7		–	2	2	8.00
Unknown 8		–	2	2	8.00
Unknown 9		–	1	1	4.00
Unknown 10		–	4	3	12.00
Unknown 11		–	1	1	4.00
Unknown 13		–	1	1	4.00
Unknown 14		–	25	2	8.00
Unknown 15		–	2	2	8.00
Unknown 16		–	9	3	12.00
Unknown 17		–	3	1	4.00
Total in each sample		1	n=3268		

Contexts: 1: Channel 3: Burnt Pit 5: Fill below initial collapse

2: Hearth 4: Fill above final collapse 6: Trough

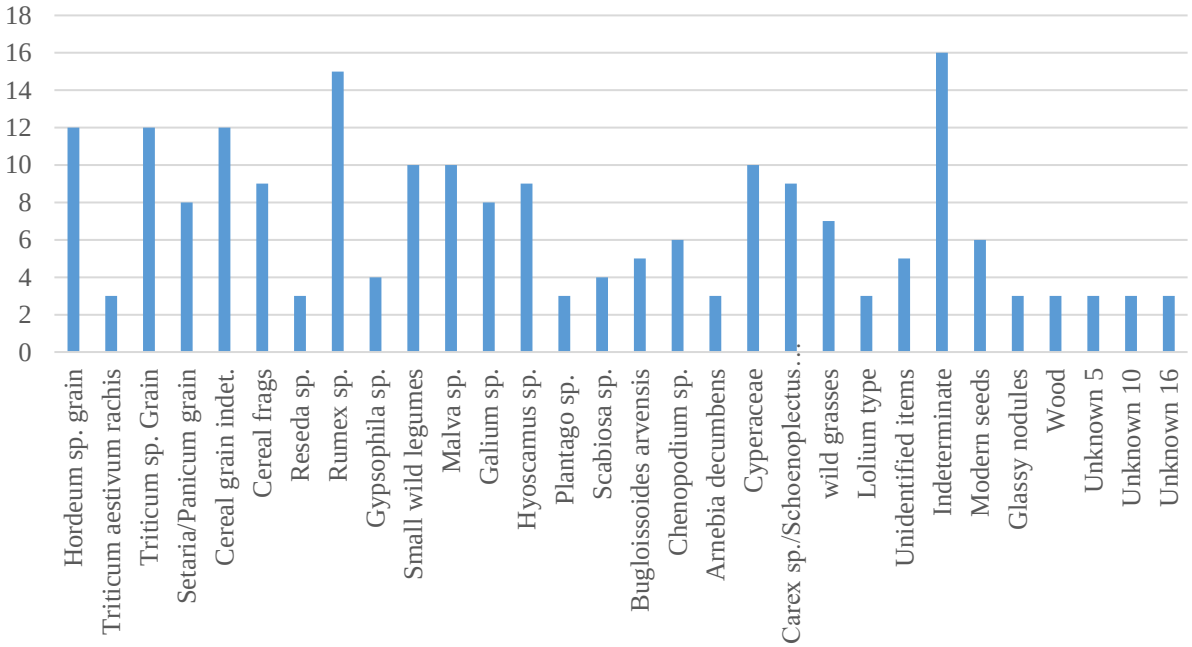
Ratios were calculated to compare the presence of cultivated types and wild and weedy types through different contexts and periods of time in the caravanserai. They provide a way to standardize the data for comparison, allowing for the assessment of different use of contexts (Miller 1988). In this study, the ratios allow for the assessment of the separation of areas for different use in the caravanserai, which was seen in the material artifacts.

Cultivated types:

Cereals

Of the cultivated types identified from all samples (N=25), cereal grains occur most frequently. Wheat (*Triticum sp.)* and barley grains (*Hordeum)* were both identified in twelve of the samples (Figure 3). Barley appears to be slightly more common in the absolute count, but the relationship is not statistically significant (Table 3). Barley had a higher importance in diet during the Bronze Age and continued to have a high importance in the Medieval Period,

Figure 3. Taxa with Ubiquity >2



however, wheat is assumed to have gained importance in diet during the Late Medieval Period (Dönmez 2006).

During the eleventh century, the climate began to change in Europe with the summers becoming cooler and wetter, while the winters were extremely cold (Gyulai 2010). This period of climate change may have influenced the increased prevalence of wheat in the diet. Wheat requires higher amount of precipitation and the proportion of wheat to barley in archaeological assemblages tends to follow rainfall (Miller 1998). Today the climate of Armenia is continental with moist springs, hot and dry summers and cold, dry winters and agriculture is reliant on irrigation with no dry farming being practiced (Hovsepyan and Willcox 2008). Lake sediment cores from southern Georgia indicate a wetter climate during the Caucasus Mountains during the Medieval Period (Kvavadze et al. 2008). If the "Little Ice Age" of Europe had impacted the climate of Armenia during the Late Medieval Period, the increased rainfall may have impacted the prevalence of wheat.

Foxtail millet (*Setaria sp.*) was recorded in fewer samples than wheat and barley, but still identified in thirty percent of the samples (Figure 4). Millet was a staple of the medieval diet and indicates seasonally-grown crops. Millet is a summer grain, while wheat and barley are winter crops (Miller 1998). It is sown in late spring with a short growing cycle and requires little water (Van Zeist et al. 2003). With dry summers, millet would have been a sustainable crop and allowed for fields to be used year-round.

Little evidence of processing was found in the samples. Bread wheat rachis (*Triticum aestivum)* and barley rachis were identified, but in low quantities and across few samples. This lack of rachis fragments indicate that processing was not occurring at the site, but rather that the grains were being transported already processed. The ceramics collected during excavation

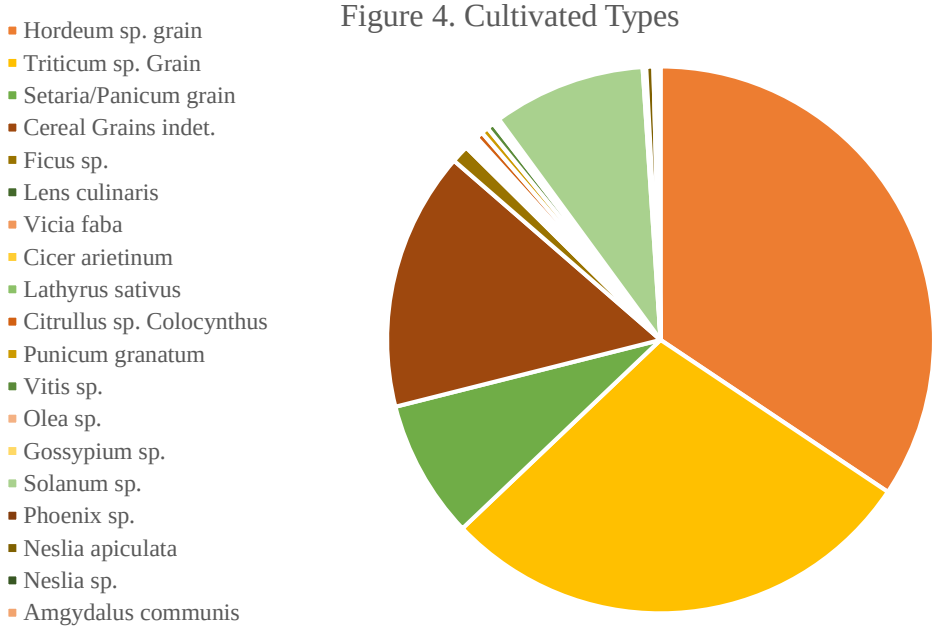
indicate that the travelers' food was being supplied locally, probably the nearby village (Franklin 2014a). The village was supplying already processed grains as part of the travelers' diet.

The indeterminate grains were too poorly preserved for identification. These were complete grain seeds, but they were unable to be sorted further. Most likely these grains are wheat or barley.

Pulses

Domesticated legumes occur in very small numbers across the samples and probably played a minor role in the diet. However this may also be due to the small number of samples and not indicative of the role of legumes in diet. The only chick pea (*Cicer arietinum*) and lentil (*Lens culinaris*) were recovered from a context after the initial collapse and were not from the use of the caravanserai. Both of the recovered seeds of vetch (*Vicia faba*) and grass pea (*Lathyrus sativus*) were recovered in contexts from below the initial collapse of the structure. The vetch seed was recovered from the waste channel.

Figure 4. Cultivated Types



Other cultivated types

Other types of cultivated remains occur in small quantities across few samples. Some of these other cultivated plants indicate the trade network, as they are not grown in region. Entire and fragmented grape seeds (*Vitis sp.*) appear in few samples, but are still present. Evidence of early use of grape from the Neolithic indicates that it has long been part of the diet in Armenia (Hovsepyan and Wilcox 2008). Pomegranate seeds (*Punicum granatum*) are common fruits in Armenia, but are recorded in low amounts in the samples. Fig seeds (*Ficus sp.*) appear in low quantities in two samples. Figs would have had to have been brought to the region from the Near East, as they do not grow locally. Other probable imports recorded are olive (*Olea sp.*) from the Mediterranean, date (*Phoenix sp.*) from the Near East, and cotton (*Gossypium sp.*) (Gyulai 2010). The presence of cotton is of interest. Cotton was commonly traded as cloth, rather than seed. Although cotton seed can be used for oil as well, it is an intensive agricultural product requiring irrigation (Miller 1998). According to Miller (1998), cotton production in the mid-twelfth century was documented as far north as Gritille. Almond (*Amgydalus communis*), *Citrullus sp.*, *Solanum sp.*, and *Neslia sp.* and *Neslia apiculate* from the mustard (Brassicaceae family) appeared in the assemblage in small quantities and across few samples. These taxa contain important agricultural products, but also wild types of species that may have been gathered. Further identification is difficult with the small numbers of seeds from these genera seen in assemblage.

Some common herbs were recorded in small frequencies across the samples. These include *Anchusa arvensis* and fumewort (*Fumaria sp.*) (Gyulai 2010). Common herbs *Teucrium sp.* and *Plantago sp.* are diverse genera and contain some important herbs. These are only seen in small frequency and highlight the loss of information when identifying only to genus. These taxa

are not included in the ratio calculations for cultivated types. These herbs were probably gathered rather than grown or were included in dung used for fuel.

Wild and Weedy types:

Sorrels (*Rumex sp.*) and sedges from the Cyperaceae family were the most frequent weedy taxa represented across samples and in absolute count (Figure 5). Both are groups of diverse wet-environment weeds. Identified Cyperaceae include *Bobelmoschus* types, *Schoenoplectus* types, *Carex sp.*, and *Elocharis* types. They would have grown close to the Kasakh River or along the stream flowing past the site and may have been used as fodder for the animals (Hovsepyan and Willcox 2008). Small wild legumes are also frequently seen in the assemblage and were common fodder. Small wild legumes, bedstraw (*Galium sp.*), wild grasses, including rye grass (*Lolium)*, goat grass (*Aegilops*) and *Bromus* type grasses, morning glory (*Convolvulus sp.*), sorrels, mallow (*Malva sp.*) and goosefoot (*Chenopodium sp.*) are all common field weeds (Van Zeist 2003). Other weedy taxa include purslane (*Portulaca sp.*), baby's breath (*Gypsophila sp.*), *Hyoscamus sp*. and many types of Boraginaceae.

Figure 5. Weedy and Wild Types

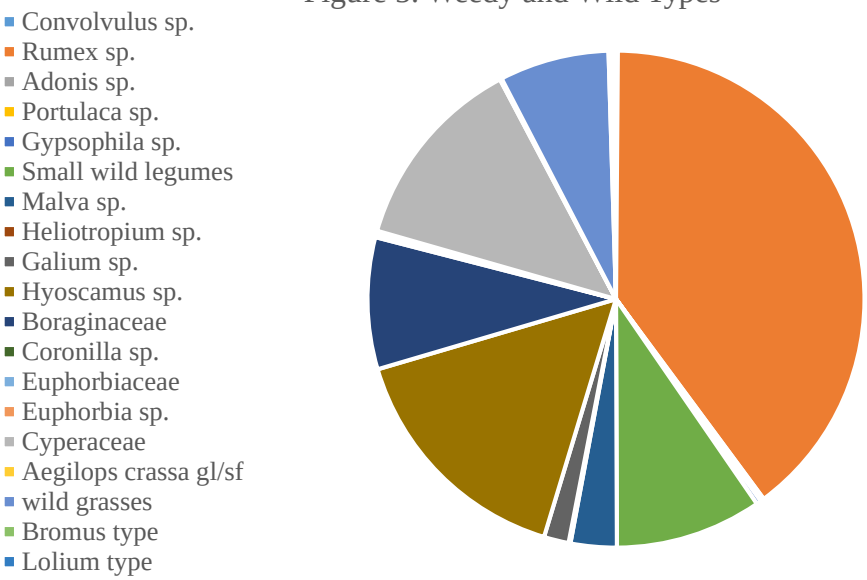


Table 3. Ratios through time and space

Description	Ratio	P-value
Ratio of grains in galleries-raised platform	0.51	0.015
Ratio of cultivated types in galleries-raised platform	0.47	0.02
Ratio of wild and weedy types in galleries-raised platforms	0.01	0.00003
Ratio of Barley-Wheat during occupation	1.37	0.25
Ratio of cultivated types-wild and weedy types in hearth and burnt feature contexts	0.24	0.00001
Ratio of cultivated types-wild and weedy types in channels	0.36	0.0005
Ratio of cultivated types-wild and weedy types in trough	1.60	0.98
Ratio of cultivated types-wild and weedy types during occupation period	0.29	0.000001
Ratio of cultivated types-wild and weedy types from initial collapse to final collapse event	0.30	0.28
Ratio of cultivated types-wild and weedy types after final collapse event	0.27	0.07

The weedy taxa are very diverse, but indicate different environments and seasonality. The seeds may have been brought into the caravanserai as fodder for the animals, as part of animal dung used as fuel, or mixed with the grains, but as processing is occurring elsewhere, this is less likely (Hovsepyan 2008). These weedy taxa could have also been used for bedding in the caravanserai (Van Zeist 2003). Hawthorn shell (*Crataegus sp.*) and fragments of Hackberry nutlets (*Celtis orientalis*) indicate the presence of woodlands in the region.

Further analysis of the weedy and wild types can provide information on crop rotation, the reuse of fields and the general environments. This analysis is difficult when only sorting to family or genus, as most taxa are diverse and inhabit different environments, but already there is evidence of wet environment, open meadows, and woodlands.

Interpretation of Ratios:

The use of ratios allows for the comparisons of types through space and time of the caravanserai. Statistical significance testing was conducted on each ratio to determine if there was a differentiation between taxa through space or time. P-values less than 0.05 indicate a significant difference between the distributions of taxa.

Through space

The architecture of the site has four main features: the side galleries, the central raised platform, the channels and the trough. The material remains indicate a separation of use in these features. The galleries housed the animals, while the humans occupied the raised central platform and used the central channels as a waste system. When comparing the ratios of the galleries (AC1 and AC3) to the central platform (AC2 and AC4) from the occupation levels of the floor, the presence of cultivated types was statistically significant (Table 3). The relationship between grains in samples from the galleries and the raised platform was also statistically significant, as well as the relationship between wild and weedy types from the galleries and platform. It must be kept in mind that little archaeobotanical remains were recovered from the galleries, but the ratios indicate a differentiation of use. Remains being used by humans were more likely to be burned, which is required for preservation.

When comparing the presence of cultivated types and wild and weedy types in the channels, the results were also significant. A much higher amount of wild and weedy types were recovered from the channel than cultivated types. This follows the conclusions drawn from the material remains that the channel was used as a waste system. The channel would collect the excess and unused seeds. Interestingly, the almond seed recovered was found in the lowest excavated locus in the channel in AC4. The grape seeds, pomegranate seeds, date, cotton seed and a majority of the fig seeds were recovered from the channels as well. The travelers would have eaten the fruit and thrown the seeds away, either straight into the channel or on the floor, where it was later swept into the pit with all of the weeds and wild seeds being brought in, purposefully or accidentally.

The relationship between cultivated types and wild and weedy types in hearth and burnt features was also statistically significant. Wild and weedy plants are more likely to be used as fuel or in the dung of grazing animals used for fuel (Hovespyan and Willcox 2008). Cereal grains are a majority of the cultivated remains found in the hearth and burnt features. Three of the five hearth and burnt feature samples post-dated the initial collapse of the structure and the low frequency of cultivated remains and the focus on cereals indicate a reuse of the abandoned caravanserai as a windbreak or short-term shelter.

The comparison of the cultivated taxa and wild and weedy taxa in the trough was not statistically significant. This is due to the few remains recovered from the trough feature.

The comparisons between spaces in the caravanserai indicate that there was some separation between the different architectural features. Along with the material artifacts excavated it appears that the separation is due to different spheres of use.

Through time

Ratios between cultivated types and wild and weedy types were calculated during occupation, from the initial collapse to the final collapse of the structure, and after the final collapse to the modern and contemporary period. The ratio between cultivated types and wild and weedy types during occupation across all features was statistically significantly different. This relationship became statistically insignificant after the initial collapse and continued to be significantly insignificant after the final collapse of the structure into the modern period. During the period of collapse, the loci excavated were fill and would indicate random preservation. The lack of material artifacts and the insignificance of the archaeobotanical remains indicate that the structure was not being used as a place to dispose of waste. After the final collapse, the site was used as a temporary shelter, but the excavations revealed only limited evidence of hearths or other features of human use.

Conclusion:

The archaeobotanical samples at the Arai-Bazarjugh caravanserai were diverse in the taxa represented. The identified cultivated types and wild and weedy types represented create a picture of a stop for people traveling along the trade highway. They would have a place to stop for the night, are provided with food supplied by the local village and able to feed their animals. Occasionally, a special food item might be eaten with the seeds being dropped in the waste channels. Eventually the building is abandoned, but people continued to utilize the structure as a temporary campsite. The Arai-Bazarjugh caravanserai was not a place to stay for extended periods of time, but rather as a place to pass through on the way to Europe, the Near East or Asia, but as trade increased, it gained its own importance on the landscape and increased the importance of its benefactor Vache Vachutyan.

With little research conducted in paleoethnobotany in Armenia and even less on caravanserais, this description of the archaeobotanical remains begins to provide information on the trade of botanicals and the social role of the caravanserai in the region. Future research on caravanserais in the Caucasus Mountains and on the nearby Ambroyi village will allow for comparisons and provide further explanations on the relationships between travelers and the local people.

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